



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of

Tadashi Ishida, et al.

Group Art Unit: 1774

Application No. 10/522,416

Examiner: BETELHEM SHEWAREGED

Filed: January 26, 2005

For: INK JET RECORDING MEDIUM

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 CFR 1.132

I, Masaya KUSUMOTO, declare and state that:

1. In March, 1990, I was graduated from Hokkaido Asahikawa Technical High-School.

Since April, 1990, I have been an employee of MITSUI Chemicals, INC., and till the present time, I have been engaged in development work in emulsion for thermosensitive recording material and for ink jet recording material.

2. I am a co-inventor of the invention described in the specification of the above-identified application.

3. The following Experiments were carried out in order to demonstrate the superiority of the presently claimed invention.

[Experiment I]

The hydrophilic ampholytic polymer of Example 1 in US6,361,768 was prepared in the following manner.

In a separable flask provided with a condenser, anchor paddle and thermometer, monomers, crosslinker, surfactant [polyoxyethylenelaurylether/HLB=8, tradename: Emulgen 103, sold by Kao corporation] and solvent shown in the following table 1 were mixed to homogenize. The mixture was heated to 60°C and blanketed with nitrogen. Then, a polymerization initiator [2,2'-azobis(2-methylbutyronitrile), trade name: V59, sold by Wako Pure Chemical Industries, Ltd.] was added to the reactor and the mixture was stirred for 7 hours to stop the reaction. The product was obtained in the slurry state that the polymer was precipitated in the solvent. The copolymer slurry was filtrated using a filter paper (No.1) to remove the solvent. The resultant product was dried at a temperature of 60°C for 12 hours to obtain the granular copolymer.

Table 1

Reagent Name	% wt	% Mol
Methacrylic Acid		9.662
Dimethylaminopropyl Methacrylamide		30.000
2-Hydroxyethyl Methacrylate		60.000
Trimethylolpropane Trimethacrylate		0.300
Polymerization initiator (V59)		0.038
Total (Polymer)		100.0
Total Solids	20.00	
Surfactant (Emulgen 103)	0.0674	
Ethyl Acetate/Cyclohexane = 54/46% wt	79.326	
Total	100.0	

The resultant copolymer was added to the deionized water so that the content was 4 wt%, and then the pH was adjusted to 3.0 with acetic acid to obtain the colorless gel. The particle size of the resin could not be measured by a dynamic light scattering method with a particle size measurement apparatus (FPAR-1000, manufactured by OTSUKA ELECTRONICS Co., Ltd.), because the polymer was dissolved in water and the scattering intensity was insufficient.

#### [Experiment II]

The hydrophilic ampholytic polymer of Example 18 in US6,361,768 was prepared in the following manner.

In a separable flask provided with a condenser, anchor paddle and thermometer, monomers, crosslinker and solvent shown in the following table 2 were mixed to homogenize. The mixture was heated to 60°C and blanketed with nitrogen. Then, a polymerization initiator [2,2'-azobis(2-methylbutyronitrile), tradename: V59, sold by Wako Pure Chemical Industries, Ltd.] was added to the reactor and the mixture was stirred for 7 hours to stop the reaction. The product was obtained in the slurry state that the polymer was precipitated in the solvent. The copolymer slurry was filtrated using a filter paper (No.1) to remove the solvent. The resultant product was dried at a temperature of 60°C for 12 hours to obtain the granular copolymer.

Table 2

Reagent Name	% wt	% Mol
Methacrylamide		74.362
Dimethylaminopropyl Methacrylamide		20.00
Methacrylic Acid		5.00
Methylene Bisacrylamide		0.60
Polymerization initiator (V59)		0.038
Total (Polymer)		100.0
Total Solids	20.00	
t-Butyl Alcohol/Water = 96/4% wt	80.00	
Total	100.0	

The resultant copolymer was added to the deionized water so that the content was 4 wt%, and then the pH was adjusted to 3.0 with acetic acid to obtain the colorless gel. The particle size of the resin could not be measured by a dynamic light scattering method with a particle size measurement apparatus (FPAR-1000, manufactured by OTSUKA ELECTRONICS Co., Ltd.), because the polymer was dissolved in water and the scattering intensity was insufficient.

#### [Experiment III]

The amphoteric polymeric organic particle having as an anionic group and a cationic group of Example 1 in the present specification was prepared in the following manner.

Deionized water (i-1) and surfactant (ii-1) [lauryltrimethylammonium chloride, trade name: Quartamin 24P, sold by Kao corporation] shown in the following table 3 were charged into a separable flask provided with a condenser, anchor paddle and thermometer, and the pH of the

mixture was adjust to 2 with an aqueous hydrochloric acid solution. The reaction mixture was heated to 65°C in a nitrogen stream, and a polymerization initiator [2,2'-azobis(2-amidinopropane)dihydrochloride, trade name: V50, sold by Wako Pure Chemical Industries, Ltd.] was added to the mixture. Separately, monomers shown in the table 3 were emulsified into deionized water (i-2) in the presence of surfactant (ii-2) [lauryltrimethylammonium chloride, trade name: Quartamin 24P, sold by Kao corporation] to thereby obtain an emulsified mixture. This emulsified mixture was dropped into the reactor over a period of 4 hours. Thereafter, the mixture was maintained at the same temperature for 4 hours to stop the reaction. The product was obtained in the emulsion state that the polymeric organic particles were dispersed in water. The emulsion had the pH of 2.7.

Table 3

Reagent Name	% wt
Styrene	11.7
t-Butyl Methacrylate	13.5
2-Hydroxyethyl Methacrylate	3.0
Methacrylic acid	1.5
Polymerization initiator (V50)	0.3
Total Solids	30.0
Surfactant (ii-1)	0.15
Surfactant (ii-2)	0.60
Deionized water (i-1)	57.25
Deionized water (i-2)	12.0
Total	100.0

The particle size of the emulsion was measured by a dynamic light scattering method with a particle size measurement apparatus (FPAR-1000, manufactured by OTSUKA ELECTRONICS Co., Ltd.). As a result, the particle size was 70nm.

4. From the results of the above experiments, the hydrophilic ampholytic polymers of US6,361,768 can not be dispersed in water in the state of particle because the polymers have a high hydrophilicity. Therefore, the hydrophilic ampholytic polymers of US6,361,768 can not produce the effect of the present invention that aggregation between the polymeric organic particles occur to form voids and thereby the excellent ink absorptivity can be obtained.

The undersigned declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Masaya Kusumoto  
Masaya KUSUMOTO

This 3rd day of December, 2007